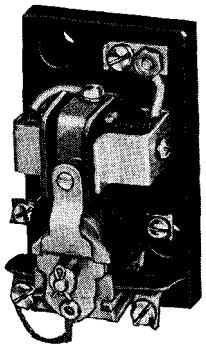
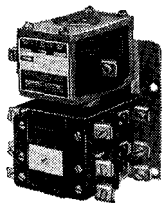
DC MAGNETIC RELAYS

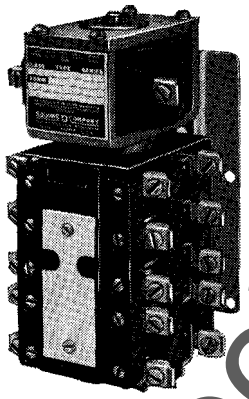
Two Wire Separate Control



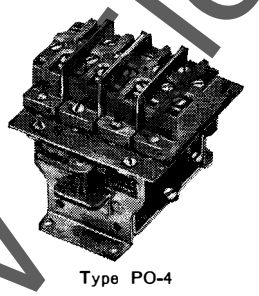
Type J-30



Type DO-42



Type DO-82



Type PO-4

CLASS 7001 — **TYPE J** — **115-230 VOLTS**

Description	No. of Poles Normally Open	Volts	DC Ampere Rating: Inductive Load	DC Ampere Rating: Non-Inductive Load	Open Type: Type	Open Type: Price	General Purpose Enclosure NEMA Type 1: Type	General Purpose Enclosure NEMA Type 1: Price
Single Pole, Single Throw	1	115	**15**	**15**	J-30	**$ 14.**	JG-30	**$ 16.50**
		230	**5**	**5**	J-31	**15.50**	JG-31	**18.**
		230	...	**10**	J-32	**15.50**	JG-32	**18.**

CLASS 7001 — **TYPE D** — **COIL — 250 VOLTS MAX.†**

Description	✱Number of Contacts: Normally Open	✱Number of Contacts: Normally Closed	Open Type: Type	Open Type: Price	General Purpose Enclosure NEMA Type 1: Type	General Purpose Enclosure NEMA Type 1: Price
2 Pole, Single Throw	2	0	DO-20	**$ 18.**	DG-20	**$ 21.**
2 Pole, Single Throw	0	2	DO-02	**21.**	DG-02	**24.**
2 Pole, Double Throw	2	2	DO-22	**23.**	DG-22	**26.**
4 Pole, Single Throw	4	0	DO-40	**22.**	DG-40	**25.**
4 Pole, 2 Double Throw, 2 N. O.	4	2	DO-42	**30.**	DG-42	**33.**
8 Pole, 4 N. O., 4 N. C.	4	4	DO-44	**30.**	DG-44	**33.**
6 Pole, 6 N. O.	6	0	DO-60	**32.**	DG-60	**35.**
8 Pole, 6 N. O., 2 N. C.	6	2	DO-62	**40.**	DG-62	**43.**
8 Pole, 2 Double Throw, 4 N. O., 2 N. C.	6	4	DO-64	**42.**	DG-64	**45.**
8 Pole, 8 N. O.	8	0	DO-80	**37.**	DG-80	**40.**
8 Pole, 6 N. O., 2 Double Throw	8	2	DO-82	**48.**	DG-82	**51.**

✱Double throw contacts must be used on same polarity.
†Contacts suitable for 600 volts. For coil voltages above 250, consult the factory.

CLASS 7001 — **TYPE P** — **COIL 250 VOLTS MAX.†**

Description	★Number of Contacts: Normally Open	★Number of Contacts: Normally Closed	Open Type: Type	Open Type: Price	General Purpose Enclosure NEMA Type 1: Type	General Purpose Enclosure NEMA Type 1: Price
One Pole	1	1	PO-1	**$ 24.**	PG-1	**$ 27.**
Two Pole	2	2	PO-2	**27.**	PG-2	**30.**
Three Pole	3	3	PO-3	**30.**	PG-3	**33.**
Four Pole	4	4	PO-4	**33.**	PG-4	**36.**
Six Pole	6	6	PO-6	**41.**	PG-6	**44.**
Eight Pole	8	8	PO-8	**47.**	PG-8	**50.**

★Each pole of the relay consists of an isolated normally open and normally closed circuit. Due to electrical clearance, the normally open and normally closed circuits of any one pole must be used on circuits of the same polarity.
†Contacts for one, two, three and four pole relays are rated 600 volts max. and the six and eight pole relays are rated 250 volts max.

ELECTRICAL CONTACT RATINGS

TYPE P RELAYS

Volts	AC Pilot Duty Amperes: Normal	AC Pilot Duty Amperes: Inrush	DC Pilot Duty Amperes: Double Throw
110	15	40	0.5
220	10	20	0.2
440	6	10	....
600	5	8	0.02

TYPE D RELAY

Current	Voltage	Pilot Duty VA or Current
DC	126-600	125 VA
	26-125	250 VA
	26 or less	10 Amp.
AC	0-600	690 VA 10 Amp. Max.

ORDERING INFORMATION REQUIRED

1—Specify Class and Type number of relay. Give voltage of operating coil.

2—Select suitable accessories and pilot control devices from Catalog Section 9001, 9007, 9011 and 9050.

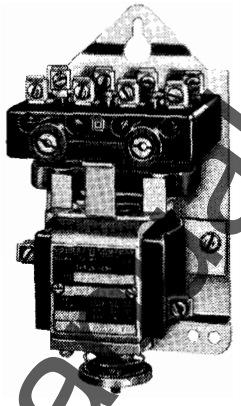
No Change

AUGUST, 1966
Supersedes Price Sheet 7001, Page 2, dated June, 1963

DC MAGNETIC RELAYS
Convertible Contacts — Multipole
TYPE Q

COIL — 250 VOLTS DC MAX. **CONTACTS — 600 VOLT**

No. of Poles	Number of Poles Normally Open	Number of Poles Normally Closed	General Purpose Enclosure NEMA Type 1 Type	General Purpose Enclosure NEMA Type 1 Price	Open Type Type	Open Type Price
2 Poles	2	0	QG-20	$ 29.	QO-20	$ 26.
	1	1	QG-11	33.	QO-11	30.
	0	2	QG-02	33.	QO-02	30.
3 Poles	3	0	QG-30	$ 33.	QO-30	$ 30.
	2	1	QG-21	36.	QO-21	33.
	1	2	QG-12	36.	QO-12	33.
	0	3	QG-03	36.	QO-03	33.
4 Poles	4	0	QG-40	$ 35.	QO-40	$ 32.
	3	1	QG-31	39.	QO-31	36.
	2	2	QG-22	39.	QO-22	36.
	1	3	QG-13	39.	QO-13	36.
	0	4	QG-04	39.	QO-04	36.
6 Poles	6	0	QG-60	$ 48.	QO-60	$ 45.
	5	1	QG-51	51.	QO-51	48.
	4	2	QG-42	51.	QO-42	48.
	3	3	QG-33	51.	QO-33	48.
	2	4	QG-24	51.	QO-24	48.
	1	5	QG-15	54.	QO-15	51.
	0	6	QG-06	54.	QO-06	51.



Type QO-40

DC ELECTRICAL CONTACT RATING

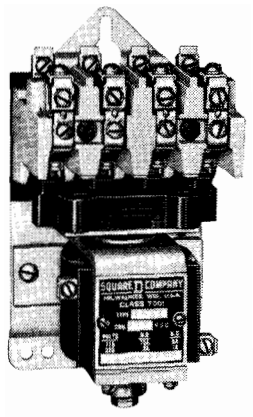
Volts	Pilot Duty † Amperes	Maximum Continuous Amperes *
24	10	10
120	2	6
240	.5	1
480	.25	.5
600	.2	.5

†The dc pilot duty rating is based on inductive loads such as coils and solenoids.
*The dc continuous rating is based on a resistive load.

TYPE R

COIL — 250 VOLTS DC MAX. **CONTACTS — 600 VOLT**

No. of Poles	Number of Poles Normally Open	Number of Poles Normally Closed	General Purpose Enclosure NEMA Type 1 Type	General Purpose Enclosure NEMA Type 1 Price	Open Type Type	Open Type Price
2 Poles	2	0	RG-20	$ 32.	RO-20	$ 29.
	1	1	RG-11	35.	RO-11	32.
	0	2	RG-02	35.	RO-02	32.
3 Poles	3	0	RG-30	$ 35.	RO-30	$ 32.
	2	1	RG-21	39.	RO-21	36.
	1	2	RG-12	39.	RO-12	36.
	0	3	RG-03	39.	RO-03	36.
4 Poles	4	0	RG-40	$ 37.	RO-40	$ 34.
	3	1	RG-31	41.	RO-31	38.
	2	2	RG-22	41.	RO-22	38.
	1	3	RG-13	41.	RO-13	38.
	0	4	RG-04	41.	RO-04	38.
5 Poles	5	0	RG-50	$ 47.	RO-50	$ 44.
	4	1	RG-41	51.	RO-41	48.
	3	2	RG-32	51.	RO-32	48.
	2	3	RG-23	51.	RO-23	48.
	1	4	RG-14	51.	RO-14	48.
	0	5	RG-05	53.	RO-05	50.



Type RO-40

DC ELECTRICAL CONTACT RATING

Volts	Pilot Duty † Amperes	Maximum Continuous Amperes *
24	15	15
120	3	9
240	1	2
480	.5	1
600	.3	1

†The dc pilot duty rating is based on inductive loads such as coils and solenoids.
*The dc continuous rating is based on a resistive load.

ORDERING INFORMATION REQUIRED

Specify Class and Type number of relay, give the voltage of the operating coil.

Contacts on Type Q and Type R relays are easily convertible from normally open to normally closed (or vice versa) without the addition of extra parts. Conversion operations are explained in the Class 7001 descriptive section.

APPLICATION

Class 7001 magnetic relays are used as auxiliary devices for controlling small motors, switching control circuits or for other light loads, such as electric heaters, pilot lights, or audible signals. These relays do not provide motor overload protection.

Electrical Ratings — The price lists contain contact ampere ratings for each type of relay listed.

Types D, J, P, Q and R relays are available with coils suitable for 250 volt dc or less. If coils for other voltages are required, consult factory.

Enclosures — General purpose, sheet steel enclosures are available for each type of relay. These enclosures are finished in baked ASA 49 gray enamel, and are provided with knockouts for conduit connections. Open type construction is also furnished.

CONSTRUCTION

Type D Relays — The Type D relay is an extremely compact relay requiring a minimum of panel space. This versatile device is available with many different pole combinations.

Terminals are provided with pressure wire connectors for fast wiring. Both front and rear stationary terminals are tilted for ease of wiring.

Contacts are clearly visible for inspection without removal of any parts. With the exception of stationary contacts, the entire relay can be disassembled and any parts changed (including coil or magnet assembly) by removing only two screws.

Coils are molded for longer life. Neater appearing than wrapped coils, molded coils are less susceptible to mechanical damage, operate cooler, and have a much lower rate of moisture absorption.

Although small in physical size, overall construction is exceptionally rugged for long trouble free mechanical and electrical life, so essential in automation applications.

Type J Relays — Class 7001 Type J Relays are compact in design and are suitable for mounting whenever space is limited.

Strong blowout coils are provided and the contacts operate inside arc barriers made from heat resistance insulating material. All metal parts are plated and terminals are both substantial and accessible.

Magnet coils for the Type J relay are wound for 230 volts or less. For higher voltages, a small resistor connected in series with the coil is mounted as an integral part of the relay.

Type P Relays — The Type P switching relay consists of a magnet frame and solid core riveted to two end plates which serve as a support for the contact assembly and as a mounting bracket for the relay.

These relays are available with 1 thru 8 poles, utilizing a totally enclosed contact mechanism. Each pole of the relay consists of a Class 9007 precision snap switch.

The 1, 2, 3 and 4 pole relays utilize a Class 9007 Type AO-2 snap switch having one normally open and one normally closed electrically isolated circuit per pole. Because of electrical clearances, however, the normally open and normally closed contacts of each pole must be used on circuits of the same polarity. Separate poles, however, can be used on circuits of the opposite polarity.

The 6 and 8 pole relays use the Class 9007 Type CO-5, 2 pole snap switch. (This snap switch is similar to the Class 9007 Type CO-3, which is listed in the catalog, except for the terminal arrangement). The 6 pole relay uses three 2 pole snap switches and the 8 pole uses four 2 pole snap switches. Each of the 2 poles of the 2 pole snap switch is electrically separate from the other and can be used on opposite polarities. Because of electrical clearances, however, the normally open and normally closed circuit of each pole must be used on circuits of the same polarity.

Type Q Relays — Type Q relays are available with up to 6 isolated contacts.

All contacts are easily convertible from normally open to normally closed or vice versa, using only a screw driver. No extra parts are required.

Molded coils are neater appearing than wrapped coils, are less susceptible to mechanical damage, operate cooler, and have a much lower rate of moisture absorption.

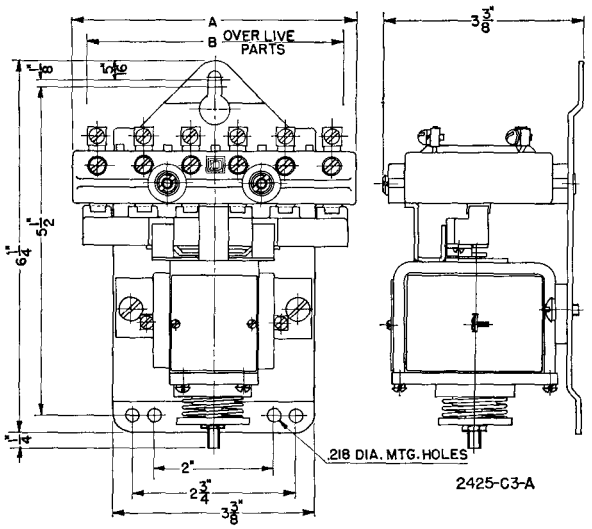
Type R Relays — The Type R are available with up to 8 isolated contacts.

All contacts are easily convertible from normally open to normally closed or vice versa, using only a screw driver. No extra parts are required.

Molded coils are neater appearing than wrapped coils, are less susceptible to mechanical damage, operate cooler, and have a much lower rate of moisture absorption.

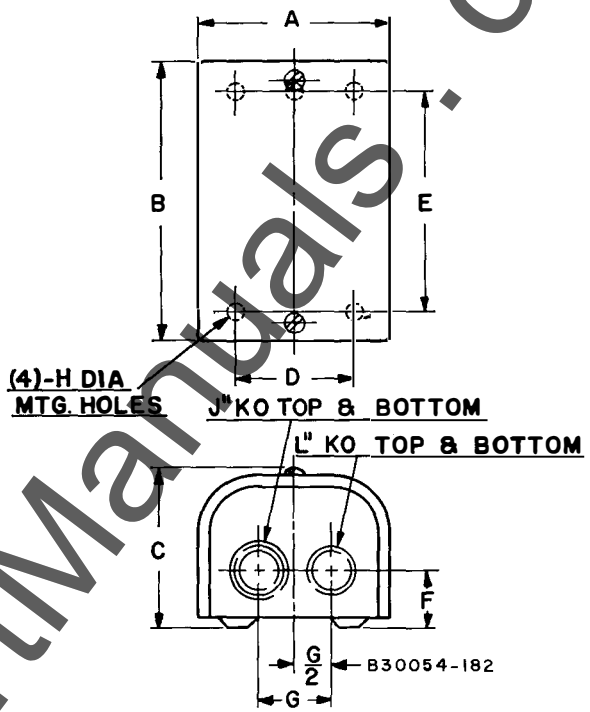
D. C. MAGNETIC RELAYS

Approximate Dimensions — Not for Construction

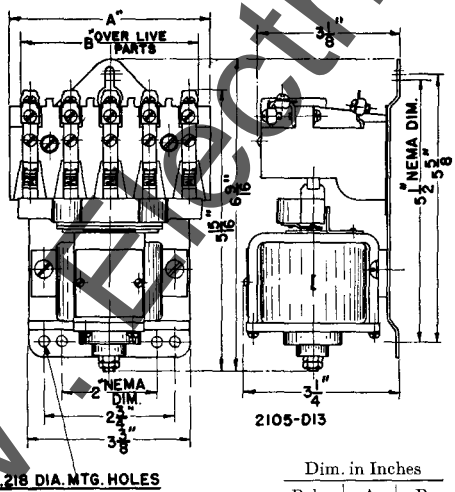


Type QO
Weight — 3 Lbs.

Poles	A	B
2-3-4	3 1/4	2 7/8
5-6	4 25/32	4 1/2



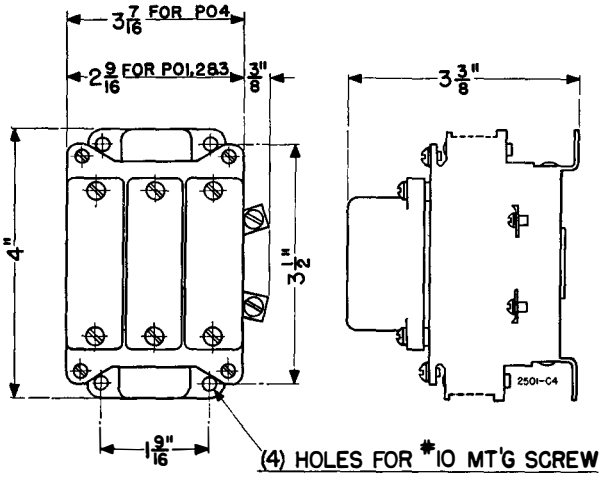
Type	General Purpose Enclosure — Dimensions										Wt. in Lbs.
	A	B	C	D	E	F	G	H	J	L	
JG-30, 31, 32	4 29/32	5 25/32	4 21/32	3 1/2	4 3/8	1 9/16	2	9/32	1/2, 3/4, 1, 1 1/4	1/2, 3/4	2
DG-20 to DG-42											4
PG-1 to PG-8											5
DG-44 to DG-82	6 5/32	8 25/32	4 21/32	4 3/4	7 3/8	1 5/16	1 7/8	9/32	1/2, 3/4, 1	1/2, 3/4, 1	4
QG-20 to QG-60											6
RG-20 to RG-50											7



Type RO
Weight — 4 Lbs.

Dim. in Inches

Poles	A	B
2-3	2 17/32	2 3/32
4	3 3/8	2 15/16
5	4 17/32	3 25/32



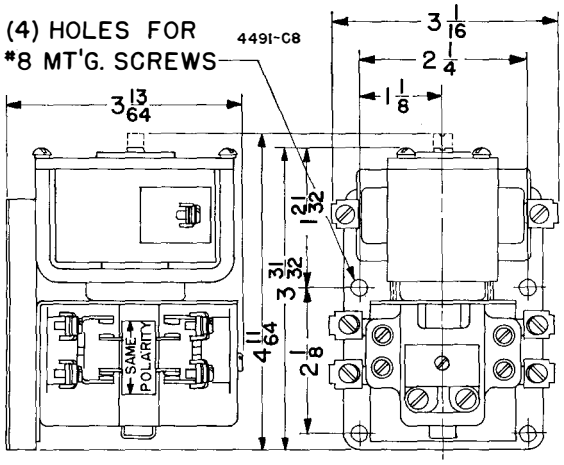
Type PO
Weight — 2 Lbs.

Dimensions are in inches.

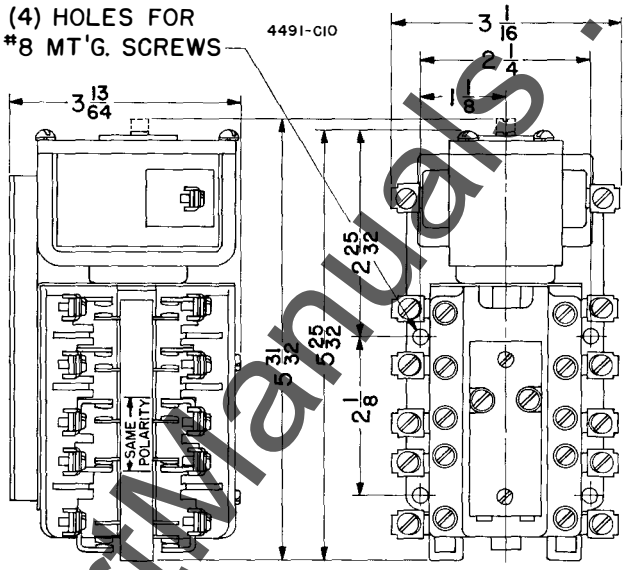
DECEMBER, 1966
Supersedes Dimension Sheet 7001, Page 2, dated March, 1959

DC MAGNETIC RELAYS

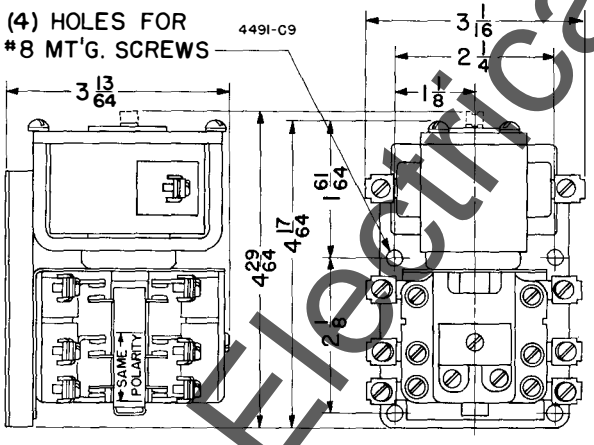
Approximate Dimensions and Shipping Weights



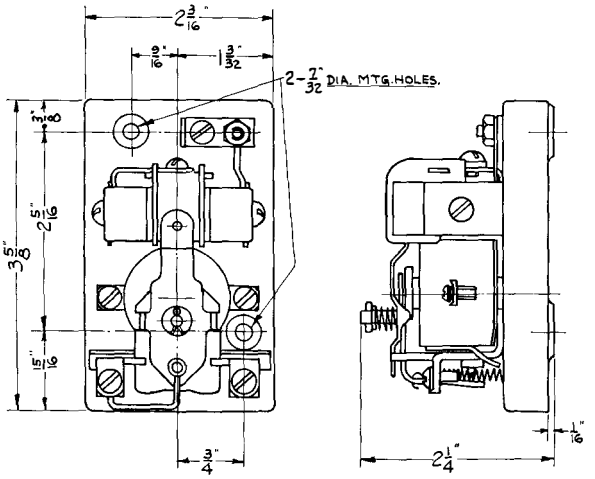
Types DO-02, DO-20, DO-22
Weight — 3 Lbs.



Types DO-44, DO-60, DO-62, DO-64, DO-80, DO-82
Weight — 3 Lbs.



Types DO-40, DO-42
Weight — 3 Lbs.



Type J-30, J-31 and J-32
Weight — 1 Lb.

General Purpose Enclosure Dimensions on Page 1

Dimensions are in inches.

Dimensions Subject to Change without Notice.

DC MAGNETIC RELAYS
FRONT CONNECTED TYPE K

Type K dc relays are specifically designed for heavy duty applications.

The Type K relays are available as:

(1) General purpose control relays with up to 4 double pole single throw contact blocks (Type KG).

(2) Voltage or current sensitive relays with up to 2 double pole single throw contact blocks (Type KE and KI).

(3) DC plugging relays (rectifier type) (Type KP).

(4) Motor shunt field switching relays with series, shunt, or series and shunt coils (Type KF).

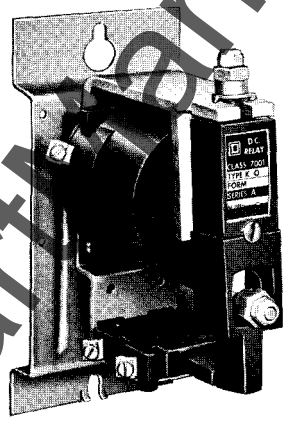
GENERAL PURPOSE CONTROL RELAY, TYPE KG

600 VOLTS DC MAXIMUM

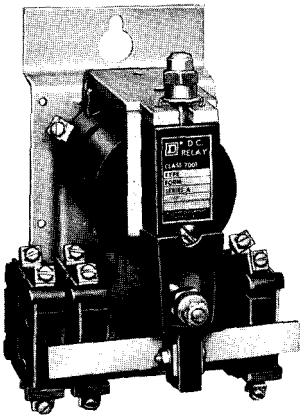
Total No. of Control Circuit Contacts		Gen. Purpose Encl. NEMA Type 1		Open Type	
N.O.	N.C.	Type	Price	Type	Price
1	0	KGG-10	$ 69.	KGO-10	$49.
1	1	KGG-11	72.	KGO-11	52.
0	1	KGG-01	69.	KGO-01	49.
2	0	KGG-20	72.	KGO-20	52.
2	1	KGG-21	77.	KGO-21	57.
2	2	KGG-22	84.	KGO-22	64.
1	2	KGG-12	77.	KGO-12	57.
0	2	KGG-02	72.	KGO-02	52.
3	0	KGG-30	80.	KGO-30	60.
3	1	KGG-31	85.	KGO-31	65.
3	2	KGG-32	91.	KGO-32	71.
3	3	KGG-33	96.	KGO-33	76.
2	3	KGG-23	91.	KGO-23	71.
1	3	KGG-13	85.	KGO-13	65.
0	3	KGG-03	80.	KGO-03	60.
4	0	KGG-40	85.	KGO-40	65.
4	1	KGG-41	91.	KGO-41	71.
4	2	KGG-42	96.	KGO-42	76.
4	3	KGG-43	102.	KGO-43	82.
4	4	KGG-44	108.	KGO-44	88.
3	4	KGG-34	102.	KGO-34	82.
2	4	KGG-24	96.	KGO-24	76.
1	4	KGG-14	91.	KGO-14	71.
0	4	KGG-04	85.	KGO-04	65.

ORDERING INFORMATION REQUIRED

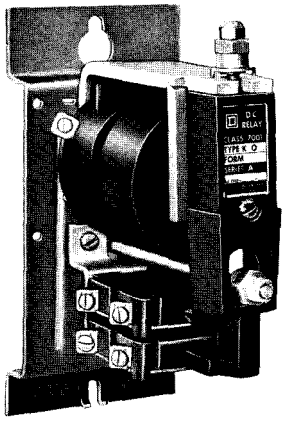
1. Class and type number
2. Coil voltage



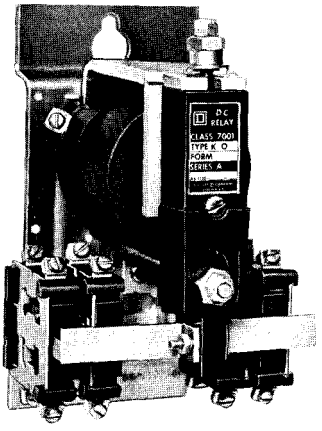
Type KGO-11



Type KGO-33



Type KGO-22



Type KGO-44

DC MAGNETIC RELAYS
FRONT CONNECTED TYPE K

VOLTAGE SENSITIVE RELAY, TYPE KE

600 VOLTS DC MAXIMUM

Total No. of Control Circuit Contacts		Gen. Purpose Encl. NEMA Type 1		Open Type	
N.O.	N.C.	Type	Price	Type	Price
1	0	KEG-10	$79.	KEO-10	$59.
1	1	KEG-11	82.	KEO-11	62.
0	1	KEG-01	79.	KEO-01	59.
2	0	KEG-20	82.	KEO-20	62.
2	1	KEG-21	87.	KEO-21	67.
2	2	KEG-22	94.	KEO-22	74.
1	2	KEG-12	87.	KEO-12	67.
0	2	KEG-02	82.	KEO-02	62.

ORDERING INFORMATION REQUIRED

1. Class and type number
2. System voltage
3. Pick-up and/or drop-out setting

CURRENT SENSITIVE RELAY, TYPE KI

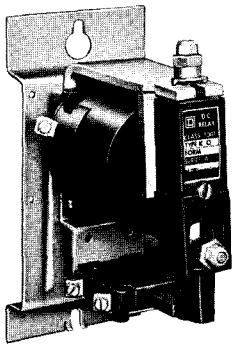
600 VOLTS DC MAXIMUM

Total No. of Control Circuit Contacts		Gen. Purpose Encl. NEMA Type 1		Open Type	
N.O.	N.C.	Type	Price	Type	Price
1	0	KIG-10	$84.	KIO-10	$64.
1	1	KIG-11	87.	KIO-11	67.
0	1	KIG-01	84.	KIO-01	64.
2	0	KIG-20	87.	KIO-20	67.
2	1	KIG-21	92.	KIO-21	72.
2	2	KIG-22	99.	KIO-22	79.
1	2	KIG-12	92.	KIO-12	72.
0	2	KIG-02	87.	KIO-02	67.

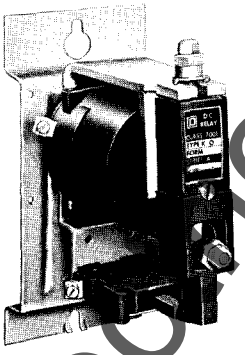
Note: Maximum coil rating 258 amp. continuous. For higher current coils consult factory.

ORDERING INFORMATION REQUIRED

1. Class and type number
2. Coil, maximum continuous amperes
3. Pick-up and/or drop-out setting



Type KEO-11

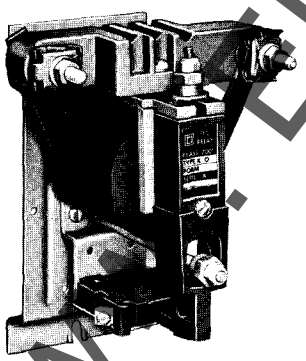


Type KIO-10

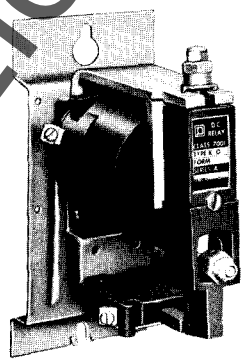
PLUGGING RELAY, TYPE KP

600 VOLT DC MAXIMUM

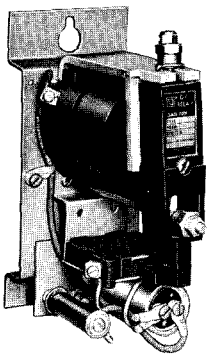
Relay Function	System Voltage	Contacts	Gen. Purpose Encl. NEMA Type 1		Open Type	
			Type	Price	Type	Price
Single Step	120	1 NC	KPG-1	$79.	KPO-1	$59.
Plugging System or Second Step	240	1 NC	KPG-2		KPO-2	
For Two Point Plugging System	440	1 NC	KPG-3		KPO-3	
	550	1 NC	KPG-4		KPO-4	
First Step	240	1 NC	KPG-5	94.	KPO-5	74.
For Two Point Plugging System	440	1 NC	KPG-6		KPO-6	
	550	1 NC	KPG-7		KPO-7	



Type KIO-01
with strap wound coil



Type KPO-2



Type KPO-5

ORDERING INFORMATION REQUIRED

Class and type number

DC MAGNETIC RELAYS
FRONT CONNECTED TYPE K

FIELD RELAY, TYPE KF

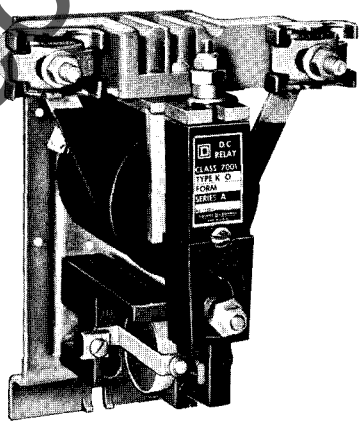
600 VOLT DC MAXIMUM

Coils		Contacts *	General Purpose Encl. NEMA Type 1		Open Type	
Type	Maximum Contin. Amps. (Series Coil)		Type	Price	Type	Price
1 Series	7.4	1 N.O.	KFG-10	$105.	KFO-10	$85.
	11.7		KFG-11		KFO-11	
	18.8		KFG-12		KFO-12	
	29.5		KFG-13		KFO-13	
	46.9		KFG-14		KFO-14	
	73.6		KFG-15		KFO-15	
	114		KFG-16		KFO-16	
	172		KFG-17		KFO-17	
	258		KFG-18		KFO-18	
2 Series	7.4	1 N.O.	KFG-30	105.	KFO-30	85.
	11.7		KFG-31		KFO-31	
	18.8		KFG-32		KFO-32	
	29.5		KFG-33		KFO-33	
	46.9		KFG-34		KFO-34	
	73.6		KFG-35		KFO-35	
	114		KFG-36		KFO-36	
	172		KFG-37		KFO-37	
	258		KFG-38		KFO-38	
1 Series & 1 Shunt	7.4	1 N.O.	KFG-50	105.	KFO-50	85.
	11.7		KFG-51		KFO-51	
	18.8		KFG-52		KFO-52	
	29.5		KFG-53		KFO-53	
	46.9		KFG-54		KFO-54	
	73.6		KFG-55		KFO-55	
	114		KFG-56		KFO-56	
	172		KFG-57		KFO-57	
	258		KFG-58		KFO-58	
1 Shunt	240 Volt	1 N.O.	KFG-70	75.	KFO-70	55.
	120		KFG-71		KFO-71	
	440		KFG-72		KFO-72	
	550		KFG-73		KFO-73	

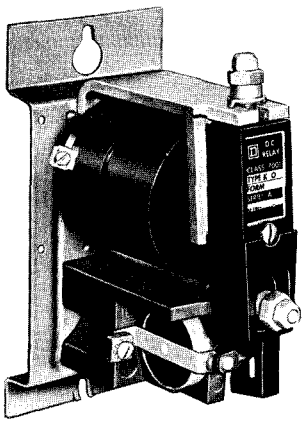
*For 1 NC contact in place of NO contact specify form NC.

ORDERING INFORMATION REQUIRED

1. Class and type number
2. Form number
3. System voltage
4. Pick-up and/or drop-out settings



Type KFO-57



Type KFO-70

DC MAGNETIC RELAYS
FRONT CONNECTED TYPE K

APPLICATION DATA

MOUNTING

The Type K relays make use of a steel mounting plate and can therefore be mounted directly onto a steel pan or a steel framework structure of suitable dimensions.

CONTACTS

All Type K relays with the exception of the Type KF field relay use the same basic contact block. Each control circuit block may contain one normally open contact, one normally closed contact, or one normally open and one normally closed contact. The contact block on the Type KG, KE, and KI Relays is rated in accordance with NEMA Standard IC 1-2.79 for a heavy duty rating.

CONTACT RATINGS

Relay Type	Continuous Current	System Voltage	Interrupting Rating (Inductive)
KG	10 Amps	115-125	2.2 Amps
KE		230-250	1.1 Amps
KI		550-600	0.4 Amps
KF	25 Amps	115-600	25 Amps ①
			15 Amps ②

●The type KF relay can interrupt 25 amps when used to switch resistance in a motor shunt field circuit. Examples are relays designated as FA, FFA, FK, and FD.

②The type KF relay interrupting rating is limited to 15 amps when the relay is used to switch highly inductive circuits consisting of contactor and relay combinations. A typical example would be a low voltage protective relay, designated UV.

WIRING

All wires can be terminated directly at the relay. Each contact block has self-aligning, captive screw type wire clamps. Similar wire clamps are used on the coil terminals. Since these relays are completely front mounted and front connected, all wires are accessible from the front.

COIL DATA

The operating coils of the Type KG general purpose relay are designed in accordance with NEMA standards to withstand 110% of rated voltage continuously and to operate the relay successfully at 80% of rated voltage.

VOLTAGE SENSITIVE RELAY TYPE KE

The Type KE relay is very similar to the Type KG relay, except that the relay is limited to a maximum of 2 contact blocks. Various coils, operating springs, core caps, and core cap spacers permit this relay to be adjusted for a large range of pick-up and/or drop-out characteristics.

APPLICATIONS

Relay Designation	Relay Function	Type	Coil Volts	Relay Setting
LSR	LIMIT SWITCH RELAY used on hoist controllers.	KEO-01	120	55V P.U.
NP	NON-PLUG RELAY for compound and shunt motors.	KEO-02	240	Min. D.O.
VR	VOLTAGE RELAY initiates high speed lowering on hoist controllers.	KEO-11	240	105V P.U.
VR	VOLTAGE RELAY used on reversing-plugging controllers with Emergency or Service Dynamic Braking.	KEO-11	240	Min. D.O.
1VR	VOLTAGE RELAYS used on hoist controllers. 1VR initiates high speed lowering. 2VR functions as an overspeed relay.	KEO-11	120	105V P.U.
2VR		KEO-11	120	250V P.U.
VR	VOLTAGE RELAY used to control application of armature shunt contactors on multi-step slowdown circuits.	KEO-11	as required	as required
VR	VOLTAGE RELAY used for over voltage protection on adjustable voltage controllers.	KEO-11	as required	as required
VR	VOLTAGE RELAY used for clamping circuit to provide fast start in slow speed operating range of controller.	KEO-11	as required	as required

ADJUSTMENT RANGE

Relay pick-up is adjustable between 20% and 134% of rated coil voltage.
Relay drop-out is adjustable between 4% and 98% of rated coil voltage.
Pick-up and drop-out adjustments are not independent of each other.

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DC MAGNETIC RELAYS
FRONT CONNECTED TYPE K

APPLICATION DATA

CURRENT SENSITIVE RELAY TYPE KI

The Type KI relay is essentially the same device as the Type KE relay, except that a current coil is used in place of the voltage coil. For low currents, the terminals are on the operating coil. For higher current applications a wire wound or strap wound coil is used. Coil leads are brought to a power termination block at the top of the relay.

APPLICATIONS

Relay Designation	Relay Function	Type
FL	FIELD FAILURE RELAY for compound and shunt motors.	KIO-10
JR	JAM RELAY limits stall torque on series motors.	KIO-01
LR	LOAD RELAY operates at a preset current (load).	KIO-11
SR	SERIES RELAY used as shunt brake interlock relay.	KIO-10

ADJUSTMENT RANGE

Relay pick-up is adjustable between 20% and 134% of rated coil current.
Relay drop-out is adjustable between 4% and 98% of rated coil current.
Pick-up and drop-out adjustments are not independent of each other.

DC PLUGGING RELAY TYPE KP

Plugging relays are used on almost all dc reversing controllers. Typical applications would include the reversing controls on mill run-out tables and such reversing travel motions as crane bridge and trolley, transfer cars, etc.

The Type KP relay is a rectifier type plugging relay with the rectifier diode molded as an integral part of the operating coil. The appearance of the Type KP relay is essentially the same as the Type KG with a single contact block. The relay is furnished with one normally closed contact. Relays KPO-1 through KPO-4 operate when the motor approaches standstill and are thus suitable for use on a single step plugging scheme or as the final step in a two step plugging scheme. Relays KPO-5 through KPO-7 operate at about motor full load speed and are therefore used in the first plugging step of a two step scheme. To achieve the correct pick-up and drop-out characteristics, relays KPO-5, 6, 7 include a resistor and capacitor mounted to the relay base.

FIELD RELAY TYPE KF

The Type KF relay uses the same basic structure as all the preceding relays. However, a special contact block is used with the field relay to provide higher current carrying and interrupting capacity for inductive motor field circuits. The field relay is available with various coils and coil combinations depending on the function the relay is expected to perform. The Type KF relay may have a single series coil or a single shunt coil. The relay could also have a combination of two series coils or a combination of one shunt and one series coil.

APPLICATIONS

Relay Designation	Relay Function	Type
FA	ACCELERATION of Adjustable Speed Motors on weakened field. (Requires provision on the Control with which it is used, for short-circuiting the Relay Contacts in order to provide full field during acceleration to base speed).	KFO-10 thru KFO-18
FFA	ACCELERATION of Adjustable Speed Motors on weakened field and provides full field during acceleration to base speed.	KFO-30 thru KFO-38
FK	ACCELERATION and DECELERATION of Adjustable Speed Motors. Provides full field during acceleration to base speed and during dynamic braking for stopping; also provides for acceleration on weakened field.	KFO-50 thru KFO-58
FD	DECELERATION of Adjustable Speed Motors by alternately strengthening and weakening the shunt field during dynamic braking.	KFO-50 thru KFO-58 Form NC
UV	LOW VOLTAGE PROTECTIVE RELAY used on DC Crane and Mill Controllers with protection.	KFO-70 thru KFO-73

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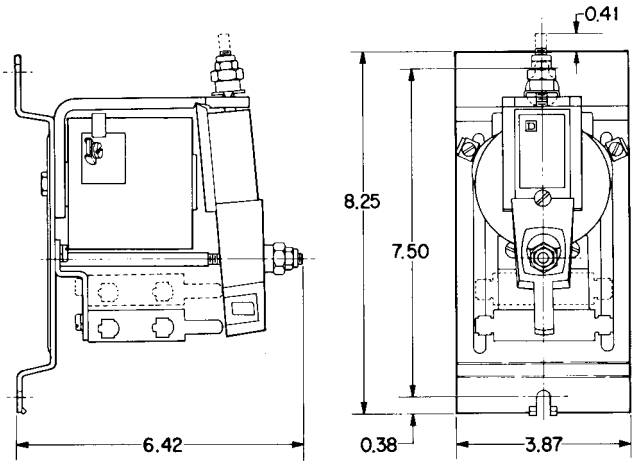
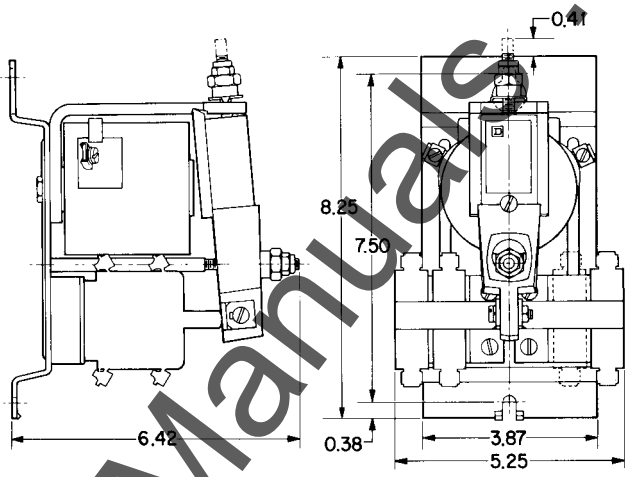
DC MAGNETIC RELAYS
FRONT CONNECTED TYPE K

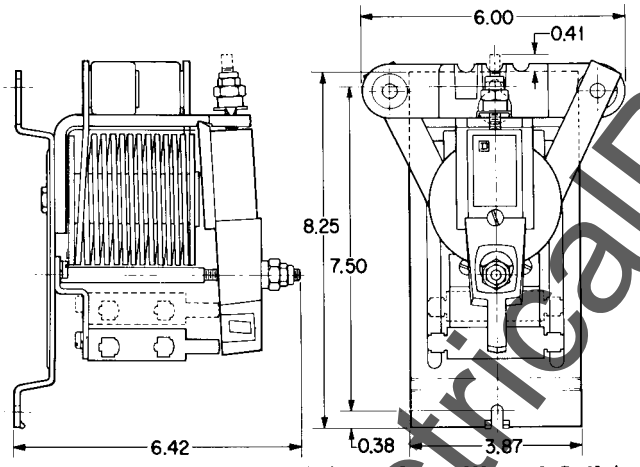
APPROXIMATE DIMENSIONS—NOT TO BE USED FOR CONSTRUCTION UNLESS SPECIFICALLY ENDORSED.



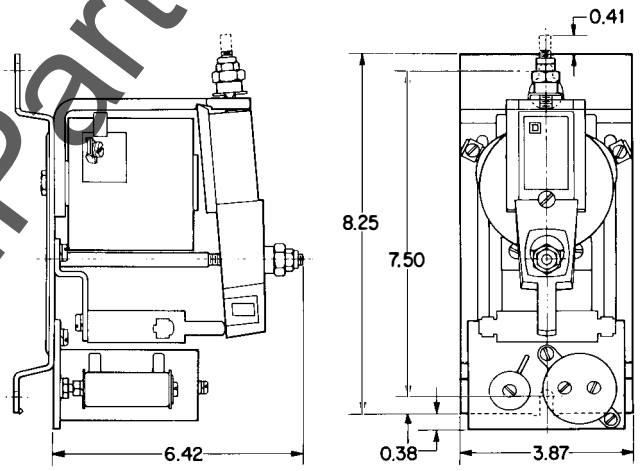
TYPE KGO-10 thru KGO-02, TYPE KEO-10 thru KEO-02, TYPE KPO-1 thru KPO-4 and TYPE KIO-10 thru KIO-02 (with Form Wound Coils)



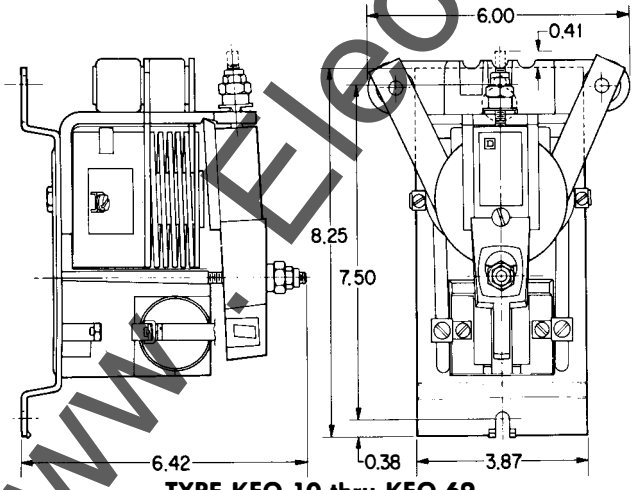
TYPE KGO-30 thru KGO-04



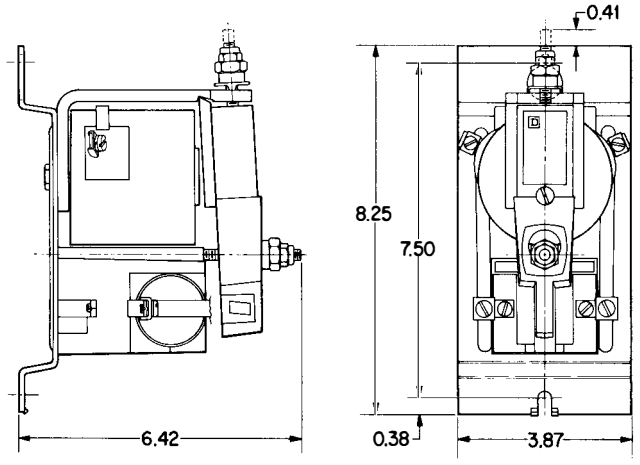
TYPE KIO-10 thru KIO-02 (with Strap Wound Coils)



TYPE KPO-5 thru KPO-7



TYPE KFO-10 thru KFO-69



TYPE KFO-70 thru KFO-73

All relays have two mounting holes for ¼" screws.
Approximate net weight 7 lbs.

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All dimensions are in inches and subject to change without notice.